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DEPARTMENT OF HEALTH AND HUMAN SERVICES

Office of the Secretary

Findings of Research Misconduct

AGENCY: Office of the Secretary, HHS

ACTION: Notice.

SUMMARY: Findings of research misconduct have been made against Daniel Leong, Ph.D. (Respondent), formerly a Research Technician, Albert Einstein College of Medicine (AECM). Respondent engaged in research misconduct in research supported by U.S. Public Health Service (PHS) funds, specifically National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS), National Institutes of Health (NIH), grant R01 AR050968 and National Heart, Lung, and Blood Institute (NHLBI), NIH, grant P01 HL110900. The administrative actions, including debarment for a period of four (4) years followed by supervision for a period of four (4) years, were implemented beginning on February 28, 2022, and are detailed below.

FOR FURTHER INFORMATION CONTACT:

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SUPPLEMENTARY INFORMATION: Notice is hereby given that the Office of Research Integrity (ORI) has taken final action in the following case:

Daniel Leong, Ph.D., Albert Einstein College of Medicine: Based on the report of an investigation conducted by AECM and analysis conducted by ORI in its oversight review, ORI found that Dr. Daniel Leong, formerly a Research Technician, AECM, engaged in research misconduct in research supported by PHS funds, specifically NIAMS, NIH, grant R01 AR050968 and NHLBI, NIH, grant P01 HL110900.

ORI found that Respondent engaged in research misconduct by intentionally, knowingly, or recklessly falsifying and/or fabricating data included in sixteen (16) grant applications submitted for PHS funds:

- R01 AR065563-01, "CITED2 and Chondroprotection," submitted to NIAMS, NIH, on 02/05/2013.

- R01 AR066009-01, "Remote Loading for Osteoarthritis," submitted to NIAMS, NIH, on 06/04/2013.

- R01 AR065563-01A1, "CITED2 and Chondroprotection," submitted to NIAMS, NIH, on 11/05/2014.

- R41 AR070695-01, "A novel product for tendinopathy treatment," submitted to NIAMS, NIH, on 01/05/2015.

- R01 AG069693-01, “Chondrocyte fate regulation and cartilage protection,” submitted to National Institute on Aging (NIA), NIH, on 06/05/2015.

- R01 AG039561-06, “Human tendon stem progenitor cell aging and regeneration,” submitted to NIA, NIH, on 03/15/2016 (original grant funding from 08/15/2012-04/30/2018).

- R43 AT009414-01, “A novel nutraceutical drug for tendinopathy treatment,” submitted to National Center for Complementary and Alternative Medicine (NCCAM), NIH, on 04/05/2016.

- R01 AR070431-01A1, “The role of Panx1 in the pathogenesis and pain of osteoarthritis,” submitted to NIAMS, NIH, on 07/19/2016

- R41 AG056246-01A1, “A novel product for tendinopathy treatment,” submitted to NIA, NIH, on 09/06/2016, funded from 09/15/2017-08/31/2019.

- R01 AG056623-01, “Chondrocyte fate regulation and osteoarthritis,” submitted to NIA, NIH, on 10/05/2016.

- R01 AR072038-01, “MSC-derived exosomes and tendon disorders,” submitted to NIAMS, NIH, on 10/05/2016.

- R43 AT009414-01A1, “A novel nutraceutical drug for tendinopathy treatment,” submitted to NCCAM, NIH, on 04/05/2017, funded from 08/01/2018-07/31/2020.

- R01 AR073194-01, “Chondrocyte fate regulation and cartilage protection,” submitted to NIAMS, NIH, on 06/05/2017.

- R01 AR074802-01, “The role of Panx1 in the pathogenesis and pain of osteoarthritis,” submitted to NIAMS, NIH, on 04/02/2018.

- R01 AR074802-01A1, “The role of Panx1 in the pathogenesis and pain of osteoarthritis,” submitted to NIAMS, NIH, on 08/01/2018.

- R44 AG065089-01, “Botanical drug for spontaneous osteoarthritis,” submitted to NIA, NIH, on 01/07/2019.

ORI found that Respondent intentionally, knowingly, or recklessly falsified and/or fabricated Western blot and histological image data for chronic deep tissue conditions including osteoarthritis (OA) and tendinopathy in murine models by reusing image data, with or without manipulating them to conceal their similarities, and falsely relabeling them as data representing different experiments in fifty (50) figures included in sixteen (16) PHS grant applications. In the absence of reliable image data, the figures, quantitative data in associated graphs purportedly derived from those images, statistical analyses, and related text also are false.

Specifically, ORI found that:

1. Respondent reused and relabeled Western blot images from the same source to falsely represent different proteins and/or experimental results in:

    - Figure 4B in R01 AR065563-01 and R01 AR065563-01A1 and Figure 11 in R01

AR069693-01, specifically:

- "β-actin" panel for "Cartilage" and "β-actin" panel for "Liver" are the same
- "β-actin" panel for "Bone" and "β-actin" panel for "Spleen" are the same
- "Cited2" blot band for Cartilage in "WT" and "Sham" are the same
- "Cited2" blot band for Bone in "WT" and "Sham" are the same
- "Cited2" blot band for Liver in "WT" and "Sham" are the same
- "Cited2" blot band for Spleen in "WT" and "Sham" are the same

- Figure 2A in R01 AG056623-01 and R44 AG065089-01 and Figure 1A in R01 AR073194-01, specifically:

- "β-actin" panel for "Cartilage" and "β-actin" panel for "Liver" are the same

- Cited2 blot bands in "WT" and "Sham" within each of the three panels represent Cartilage, Bone, and Liver

2. From Figure 11C in R01 AR065563-01 and Figure 16 in R01 AR066009-01, Respondent copied blot panels representing rAAV-vector and rAAV-GFP in human cartilage explants, flipped, resized, added a lane to the left, and reused and relabeled the bands to falsely represent "Sham" and "KO" samples in conditional knock out of Cited2 gene in cartilage of adult mice in:

- Figure 4B in R01 AR065563-01
- Figure 4B in R01 AR065563-01A1
- Figure 11 in R01 AR069693-01
- Figure 2A in R01 AG056623-01
- Figure 1A in R01 AR073194-01
- Figure 2A in R44 AG065089-01

3. Respondent reused and relabeled the same photomicrographs of supraspinatus tendon tissue from tendinopathy rats exposed to different experimental conditions in:

- Figure 2A in R01 AR072038-01 to falsely represent overuse tendinopathy in rats treated with ex-ADSC-2D (control exosomes)

- Figure 2A in R01 AG039561-06 to falsely represent overuse tendinopathy nude rats with placebo treatment

- Figure 4A in R41 AR070695-01 to falsely represent overuse tendinopathy nude rats with placebo treatment

- Figure 3A in R43 AT009414-01 and R43 AT009414-01A1 to falsely represent collagenase induced Achilles tendinopathy in rats with placebo treatment

4. Respondent reused and relabeled the same photomicrographs in:

- Figure 2A in R01 AR072038-01 to falsely represent overuse tendinopathy in rats injected with ex-ADSC-3D

- Figure 1A in R01 AG039561-06 to falsely represent collagenase-induced tendinopathy in rats injected with Cited2 reprogrammed tendon stem/progenitor cells (TSPCs)

5. Respondent reused and relabeled photomicrographs from Figure 2C in R01 AR072038-01 representing cleaved collagen-1 stained supraspinatus tendon of overuse tendinopathy rats injected with placebo + ex-ADSC-2D to falsely represent:

- supraspinatus tendon tissue of overuse tendinopathy in rats after placebo injection in:

  - Figure 2C in R01 AR072038-01
  - Figure 5D in R41 AG056246-01A1
  - Figure 2B in R01 AG039561-06

- Achilles tendon tissue of collagenase-induced tendinopathy rats after placebo injection in

Figure 3D in R43 AT009414-01

6. Respondent reused and relabeled photomicrographs of human cartilage explants presented in R01 AG069693-01. Specifically, Respondent reused image panels from R01 AG069693-01:

- Figure 12A representing NITEGE in non-arthritic (non-OA) sample in:

  – Figure 11A in R01 AR065563-01, Figure 8A in R01 AG069693-01, and Figure 1A in R01 AG056623-01 to falsely represent NITEGE stained non-OA sample

  – Figure 3 in R01 AR070431-01A1 to falsely represent IL-1β stained OA sample

- Figure 8A representing ADAMTS5 in non-OA and OA samples in:

  – Figure 1A in R01 AG056623-01 to falsely represent p16 stained samples

- Figure 8A, two images representing matrix metalloproteinase 13 (MMP-13) and ADAMTS5 of OA samples in:

  - Figure 3 in R01 AR070431-01A1 to falsely represent NLRP3 or cleaved caspase 1

  - Figure 1A in R01 AG056623-01 to falsely represent p21 and p16

- Figure 8B, two images in sham or destabilization of the medial meniscus (DMM) operated mouse representing:

  - MMP-13 reused and relabeled in Figure 1B in R01 AG056623-01 to falsely represent p21

  - ADAMTS5 reused and relabeled in Figure 1B in R01 AG056623-01 to falsely represent p16

7. Respondent reused and relabeled photomicrographs of non-OA or OA human cartilage explants presented in Figure 3 in R01 AR070431-01A1 representing:

   - cleaved caspase 3 to falsely represent β-gal staining in Figure 1A in R01 AG056623-01

   - NLRP3 or cleaved caspase-1 staining of non-OA human cartilage to falsely represent p21 and p16 in Figure 1A in R01 AG056623-01

8. Respondent reused and relabeled photomicrographs from the following published papers to falsely represent unrelated experimental results in NIH grant applications:

- Green tea polyphenol treatment is chondroprotective, anti-inflammatory and palliative in a mouse post-traumatic osteoarthritis model. *Arthritis Res Ther*. 2014 Dec 17;16(6):508; doi: 10.1186/sl3075-014-0508-y (hereafter referred to as "*Arthritis Res Ther*. 2014"). Erratum in: *Arthritis Res Ther*. 2019, Jan 3;21(1):1; doi: 10.1186/s13075-018-1791-9.

- Curcumin slows osteoarthritis progression and relieves osteoarthritis-associated pain symptoms in a post-traumatic osteoarthritis mouse model. *Arthritis Res Ther*. 2016 Jun 3; 18(1):128; doi: 10.1186/s13075-016-1025-y (hereafter referred to as "*Arthritis Res Ther*. 2016").

- Procyanidins Mitigate Osteoarthritis Pathogenesis by, at Least in Part, Suppressing Vascular Endothelial Growth Factor Signaling. *Int. J. Mol. Sci*. 2016, 17:2065; doi:10.3390/ijms17122065 (hereafter referred to as "*Int. J. Mol. Sci*. 2016").

Specifically, in:

- R01 AR070431-01A1, Respondent reused an image panel from:

– *Arthritis Res Ther*. 2016:

- Figure 6A representing type II collagen cleavage epitope (Col2-3/4 M) vehicle control and relabeled to falsely represent aggrecan cleavage in DMM WT in Figure 2E in R01 AR070431-01A1

- Figure 6D representing ADAMTS5 staining of a vehicle control and relabeled twice in Figure 2F in R01 AR070431-01A1 to falsely represent IL-1β and cleaved caspase staining

– *Arthritis Res Ther*. 2014:

- Figure 2C representing Col2-3/4 M in vehicle treated sham operated mice and relabeled twice in Figures 2E and 2F in R01 AR070431-01A1 to falsely represent cleaved caspase and IL-1β respectively in sham operated WT mice

- Figure 2C representing Col2-3/4 M in epigallocatechin3-gallate (EGCG) treated DMM mice in Figure 2E in R01 AR070431-01A1 and relabeled to falsely represent Col2-3/4 M in Panx1 KO DMM mice

- Figure 3A representing cleaved aggrecan in sham operated EGCG treated mice and relabeled in Figure 2E in R01 AR070431-01A1 to falsely represent cleaved aggrecan in sham operated untreated WT mice

- Figure 3C representing cleaved aggrecan in DMM WT mice treated with EGCG and relabeled in Figure 2E in R01 AR070431-01A1 to falsely represent cleaved

aggrecan in DMM Panx1 KO mice

- Figure 4A representing MMP-13 in sham operated EGCG treated mice and relabeled in Figure 4E in R01 AR070431-01A1 to falsely represent antibody-staining control

- Figure 4C representing MMP-13 in sham operated, vehicle-treated mice and relabeled in:

  - Figure 2E in R01 AR074802-01 and R01 AR074802-01A1 to falsely represent ADAMTS5 staining in Pax1 KO DMM mice

  - Figure 2F in R01 AR070431-01A1 to falsely represent NLRP3 staining of Pax1 KO DMM mice

- Figure 4C representing MMP-13 in DMM vehicle treated mice and relabeled in:

  - Figure 2E in R01 AR074802-01 and R01 AR074802-01A1 to falsely represent MMP-13 in DMM WT mice

  - Figure 2F in R01 AR070431-01A1 to falsely represent NLRP3 in DMM WT mice

- Figure 5C representing ADAMTS5 in sham operated EGCG treated mouse and relabeled twice in Figure 2E in R01 AR074802-01 and R01 AR074802-01A1 to falsely represent ADAMTS5 in sham operated WT mice

        - Figure 5C representing ADAMTS5 in vehicle treated DMM operated mouse sample and relabeled twice in Figure 2E in R01 AR074802-01 and R01 AR074802-01A1 to falsely represent ADAMTS5 in DMM WT mouse sample

- R01 AG056623-01, Respondent reused an image panel from:

  - *Int.J. Mol. Sci*. 2016:

        - Figure 1A representing cartilage from “sham” wildtype C57BL/6 mice treated with oral PBS and relabeled in Figure 2B in R01 AG056623-01 to falsely represent knee cartilage from “sham” Col2a1CreERTxCited2fl/fl mice injected with corn oil without tamoxifen

  - *Arthritis Res Ther*. 2014:

- Figure 4A representing MMP-13 in vehicle-treated mice 4-weeks post DMM surgery and relabeled in:

  - Figure 8 in R01 AG056623-01 to falsely represent p21 in control mice following DMM surgery

  - Figure 3 in R01 AG056623-01 to falsely represent β-gal in Cited2 KO mice

- Figure 4A representing MMP-13 in EGCG -treated mice 4-weeks post DMM surgery and relabeled in Figure 8 in R01 AG056623-01 to falsely represent p21 following DMM surgery in mice overexpressing Cited2

- Figure 4C representing MMP-13 in vehicle-treated mice 8-weeks post sham surgery and relabeled in Figure 2C in R01 AG056623-01 to falsely represent p21 staining in Cited2 KO mice following DMM surgery

- Figure 4C representing MMP-13 in EGCG-treated mice 8-weeks post DMM surgery and relabeled in Figure 2C in R01 AG056623-01 to falsely represent p21 in oil-injected control mice with Cited2 conditional deletion in cartilage without Tamoxifen

- Figure 5A representing ADAMTS5 in vehicle-treated DMM-induced OA mice and relabeled in:

  - Figure 8 in R01 AG056623-01 to falsely represent p16 in control mice following DMM surgery

- Figure 2C in R01 AG056623-01 to falsely represent β-gal in Cited2 KO mice

- Figure 3 in R01 AG056623-01 to falsely represent β-gal in WT control mice with conditional deletion of Cited2 in cartilage

- Figure 5C representing ADAMTS5 in vehicle-treated DMM-induced OA mice and relabeled in:

  - Figure 8 in R01 AG056623-01 to falsely represent Cited2 in Cited-overexpressing mice, as well as β-gal in control mice following DMM surgery

  - Figure 2C in R01 AG056623-01 to falsely represent p16 staining in Cited2 KO mice

  - Figure 8 in R01 AG056623-01 to falsely represent p16 in control mice following DMM surgery

Respondent neither admits nor denies ORI's findings of research misconduct. The parties entered into a Voluntary Settlement Agreement (Agreement) to conclude this matter without further expenditure of time, finances, or other resources. The settlement is not an admission of liability on the part of the Respondent.

Respondent voluntarily agreed to the following:

(1) Respondent will exclude himself voluntarily for a period of four (4) years beginning on February 28, 2022 (the "Exclusion Period") from any contracting or subcontracting with any agency of the United States Government and from eligibility for or involvement in nonprocurement or procurement transactions referred to as "covered transactions" in 2 CFR parts 180 and 376 (collectively the "Debarment Regulations"). At the conclusion of the Exclusion Period, Respondent agreed to have his research supervised for a period of four (4) years (the "Supervision Period"). During the Supervision Period, prior to the submission of an application for PHS support for a research project on which Respondent's participation is proposed and prior to Respondent's participation in any capacity in PHS-supported research, Respondent will submit a plan for supervision of Respondent's duties to ORI for approval. The supervision plan must be designed to ensure the integrity of Respondent's research. Respondent will not participate in any PHS-supported research until such a supervision plan is approved by ORI. Respondent will comply with the agreed-upon supervision plan.

(2) During the Supervision Period, the requirements for Respondent's supervision plan are as follows:

i. A committee of 2-3 senior faculty members at the institution who are familiar with Respondent's field of research, but not including Respondent's supervisor or collaborators, will provide oversight and guidance. The committee will review primary data from Respondent's laboratory on a quarterly basis and submit a report to ORI at six (6) month intervals setting forth the committee meeting dates and Respondent's compliance with appropriate research standards and confirming the integrity of Respondent's research.

ii. The committee will conduct an advance review of each application for PHS funds, or report, manuscript, or abstract involving PHS-supported research in which Respondent is involved. The review will include a discussion with Respondent of the primary data represented in those documents and will include a certification to ORI that the data presented in the proposed application, report, manuscript, or abstract is supported by the research record.

(3) During the Supervision Period, Respondent will ensure that any institution employing him submits, in conjunction with each application for PHS funds, or report, manuscript, or abstract involving PHS-supported research in which Respondent is involved, a certification to ORI that the data provided by Respondent are based on actual experiments or are otherwise legitimately derived and that the data, procedures, and methodology are accurately reported in the application, report, manuscript, or abstract.

(4) If no supervision plan is provided to ORI, Respondent will provide certification to ORI at the conclusion of the Supervision Period that his participation was not proposed on a research project for which an application for PHS support was submitted and that he has not participated in any capacity in PHS-supported research.

(5) During the Exclusion and Supervision Periods, Respondent will exclude himself voluntarily from serving in any advisory or consultant capacity to PHS including, but not limited to, service on any PHS advisory committee, board, and/or peer review committee.

Dated: March 21, 2022.

Wanda K. Jones,

Acting Director, Office of Research Integrity,

Office of the Assistant Secretary for Health.

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